UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

UNITED STATES GYPSUM COMPANY,	)	
	)	
Plaintiff	)	
	)	
v.	)	**No. 03 C 6027**
	)	
LAFARGE NORTH AMERICA INC., LAFARGE S.A., DAVID DOWNS, JOHN D. YOCKEY, ED GREEN, WILLIAM HARTFORD, WALTER WELDON, KURT F. KURZSHAK, and SIDNEY SPEAR,	)	**Judge Rebecca R. Pallmeyer**
	)	
Defendants.	)	

MEMORANDUM OPINION AND ORDER

Plaintiff United States Gypsum Company ("USG") is a large manufacturer of wallboard, also known as drywall. Wallboard is made of gypsum slurry, which is mixed in a mixer, sandwiched between pieces of paper, dried in a kiln to harden, and cut into boards. In 1997, USG patented a manufacturing process that involves the injection of foam into the gypsum slurry as the slurry exits the mixer. U.S. Patent No. 5,683,635 ("the '635 patent"). In this lawsuit, USG charges Defendant Lafarge North America Inc. (Lafarge) and its parent company, Lafarge S.A., with infringing the '635 patent during the period from 2000 to 2004. The parties have presented competing interpretations for several terms in the claims of the '635 patent. The court's construction of those terms follows.

BACKGROUND

A. The Patented Process

The typical wallboard manufacturing process involves mixing various ingredients—including calcined gypsum, water, and other chemicals—in a mixer to form a viscous slurry. The mixer is typically equipped with some kind of mechanical agitator, used to generate high levels of agitation for mixing up the ingredients into slurry. One of the ingredients frequently added to slurry is aqueous foam. Adding foam to the mixture induces small bubbles in the slurry, which ultimately

result in voids when the crystalline gypsum in the mixture dries and hardens. The voids improve the resulting board by making it lighter and less dense. If unevenly distributed throughout the board, however, voids can result in visible imperfections in the finished wallboard.

Though the use of foam in wallboard predates the patented process, foam was historically added directly into the mixer (or into a secondary mixer) with the slurry.[1] This practice ensured that foam would be relatively evenly distributed throughout the slurry, but the high levels of agitation inside the mixer resulted in the wasteful destruction of large quantities of foam. The process invented by USG and described in the '635 patent addresses this problem by adding the foam as the slurry exits the mixer. By locating the foam inlet close to the discharge outlet from the mixer, the patented process subjects the foam to less agitation while maintaining a relatively even distribution of foam throughout the slurry. Disputed claim 25 of the '635 patent describes this process.

From the mixer, the slurry is sandwiched between top and bottom sheets of paper, shaped to a desired thickness, dried in a kiln to harden, and cut into boards.[2] In a modern wallboard manufacturing plant, all of this occurs at high rates of speed.

Because the finished boards may be subject to a great deal of handling before their ultimate use in construction, manufacturers find it desirable to produce boards with hard edges, which can

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[1] The background section of the '635 patent describes the state of knowledge in the wallboard industry at the time the patent was issued: "It is also well known to produce a lightweight gypsum product by uniformly mixing an aqueous foam into the slurry to produce air bubbles therein. . . . It is also known that agitation conditions producing relatively high shear forces can accelerate the coalescence and escape of aqueous foam bubbles that have been inserted into an aqueous calcined gypsum slurry, and the coalescence itself can lead to nonuniform sizes and distribution of the bubbles and resultant voids. . . . Thus, a significant degree of the foam in a mixing chamber with calcined gypsum slurry has been thought to be necessary to avoid problems of nonuniform distribution, but that significant agitation can also cause problems of foam loss and nonuniform bubble size." ('635 Patent, col. 1, ll. 23-26; col. 2, ll. 11-38.)

[2] Though unnecessary for the purposes of this order, a full description of the entire wallboard manufacturing process can be found in the court's 2007 summary judgment order. *United States Gypsum Co. v. Lafarge North America, Inc*., 508 F. Supp. 2d 601, 613-17 (N.D. Ill. 2007).

survive more wear. Disputed claim 36 of the '635 patent describes one process for achieving hard edges on otherwise more porous board. The process involves separating out some slurry directly from the mixer, where the slurry is thicker and heavier because it has not been mixed with foam, and depositing it in separate streams along the edges of the paper. The remaining slurry is mixed with foam after exiting the mixer and distributed onto the paper in a different "core stream" between the streams of thick slurry, with the result that heavier slurry (without foam) hardens on the edges of the board and lighter slurry (with foam) hardens in the middle.

B. The Disputed Claims of the '635 Patent

The '635 Patent, titled "Method For Preparing Uniformly Foamed Gypsum Product With Less Foam Agitation" sets forth 47 claims. The disputed terms, emphasized below, are found in Claims 25 and 36:

> 25. A method of preparing a foamed gypsum board comprising, continuously and concurrently:
> inserting calcined gypsum and water into a **mixing chamber** through one or more inlets;
> agitating the contents of the mixing chamber to form an **aqueous dispersion of the calcined gypsum**;
> discharging the contents of the mixing chamber through a discharge outlet into a **discharge conduit**;
> inserting an aqueous foam through an inlet into the discharge conduit, such that the foam is **mildly agitated** to thereby **minimize destruction of the foam** while **uniformly dispersing the foam** in the aqueous gypsum dispersion;
> discharging the resultant dispersion from the discharge conduit and depositing the dispersion onto a moving cover sheet;
> applying a second cover sheet over the deposited dispersion; and
> allowing the resultant assembly to set and dry such that the calcined gypsum forms set gypsum having **voids uniformly dispersed therein**.
>
> . . .
>
> 36. A method of preparing a foamed gypsum board having a hard edge or edges, comprising, continuously and concurrently:
> mixing and agitating calcined gypsum and water to form an **aqueous dispersion of the calcined gypsum**;
> **dividing the aqueous dispersion to form a core stream** of the aqueous dispersion and one or more edge streams of the aqueous dispersion;
> mixing an aqueous foam into the core stream, such that the foam is **mildly agitated** to thereby **minimize destruction of the foam** while **uniformly dispersing**

the foam in the aqueous dispersion;
depositing the core stream onto a moving cover sheet;
depositing the edge stream or streams onto the cover sheet contiguous to one or both edges of the deposited core stream;
applying a second cover sheet over the deposited streams; and
allowing the resultant assembly to set and dry such that the calcined gypsum forms set gypsum and the set gypsum in the deposited core stream has **voids uniformly dispersed therein**.

C. Prosecution History

USG initially filed its patent application, including disputed claims 25 and 36, in December 1995. (Office Action Summary, Pl.s Ex. 3, at 1.) The U.S. Patent and Trademark Office ("PTO") originally rejected claims 25 and 36 in September 1996. Claim 25 was rejected as being anticipated by U.S. Patent 4,735,755 (Bischops). (*Id.* at 5-6.) The Bischops patent involved inserting aqueous foam by injecting it into a discharge conduit for calcined gypsum. (*Id.*) Claim 36 was rejected as being anticipated by U.S. Patent 4,279,673 (White). (*Id.* at 4-5.) According to the PTO, the White patent involved "dividing the aqueous dispersion to form a core stream. . . and one or more edge streams. . . [and] mixing an aqueous foam into the core stream, such that the foam is mildly agitated to thereby minimize destruction of the foam while uniformly dispersing the foam. . ." (*Id.*) Claims 25 and 36 were also rejected as obvious based on those two patents and other examples in the prior art. (*Id*. at 7-12.)

In response to the PTO's rejection, USG amended its claims. (Request for Reconsideration, Pl.'s Ex.4.) The amendment to claim 25 indicates that the process is designed to be used specifically for the manufacture of wallboard, as opposed to other gypsum products. The amended language states, further, that after slurry exits the discharge conduit, the dispersion would be deposited onto a moving cover sheet, a second cover sheet would be applied, and "the resultant assembly" would be allowed "to set and dry. . . ." (*Id*. at 3.) USG explained that the amendment was intended "to indicate that the method is being employed to prepare a gypsum product which is a board having cover sheets on both faces thereof (the conventional wallboard configuration),"

(*Id*. at 5.), to distinguish it from the Bischops patent, which dealt with cements and plasters. (*Id*. at 8.)

USG amended claim 36, as well, adding that the process was designed "such that the calcined gypsum forms set gypsum and the set gypsum in the deposited core stream has voids uniformly dispersed therein." (*Id.* at 4.) The amendment to claim 36 was made "simply to make it clear in the claim itself that the setting produces set gypsum from the calcined gypsum and that the uniform distribution of foam in the dispersion is such that a uniform distribution of voids is produced in the final product. This is the main goal of the invention as discussed throughout the specification." (*Id*. at 5.) USG disagreed with the PTO that the White patent anticipated USG's process. "[The White patent] nowhere teaches that the foam should be added to the main slurry after edge streams have been divided out. . . nor does it teach any method of subjecting the foam in the main slurry to milder agitation than the calcined gypsum." (*Id*. at 7.) The PTO apparently agreed and accepted USG's amended claims in March 1997. (Notice of Allowance, Pl's Ex. 5 at 1.)

D. This Lawsuit

In 2003, USG filed a complaint against Lafarge, a significant competitor in the wallboard manufacturing business, alleging that Lafarge infringed on claims 25 and 36 of the '635 patent. Defendant Lafarge S.A., a French corporation that owns a majority share of Lafarge North America, is also alleged to be liable for patent infringement. The parties agree that Lafarge used the accused process between 2000 and 2004. USG also alleges several state and federal claims against Lafarge, its parent company, and ten individuals who worked at USG before subsequently going to work at Lafarge.

In July 2007, the court granted in part and denied in part Defendants' motion for summary judgment. *See United States Gypsum Co. v. Lafarge North America, Inc*., 508 F. Supp. 2d 601 (N.D. Ill. 2007). In denying summary judgment on the patent claims now at issue, Judge Hart partially construed several terms of claims 25 and 36. *Id.* at 616-21. Construing claim 25, Judge

Hart determined the void uniformity referred to in that claim applied only to the core of the wallboard. "A person skilled in the art would know that wallboard is manufactured with edges that have a density different than the core. Such a person would understand that claim 25 does not make any claim regarding the edges of the board." *Id*. at 616.

Judge Hart also found that Lafarge did not literally infringe on Claim 36 because Lafarge's accused process applied its edge streams before depositing its core stream to the paper, rather than depositing edge streams after the core stream as contemplated by the '635 patent. *Id*. at 617-19. Nonetheless, Judge Hart denied defendants' motion for summary judgment as to Claim 36 under the doctrine of equivalents, holding that a trier of fact could conclude that Lafarge's accused process performed "the same function in the same way to obtain the same result as distributing the core stream first." *Id*. at 618.

Lastly, Judge Hart partially construed the disputed term "mildly agitate," holding that "mildly" should be given "its ordinary meaning of being on the low end of an absolute scale." *Id*. at 620. Judge Hart made clear, however, that his construction of the term "mildly" did not foreclose all possible comparisons to agitation as it occurred elsewhere in the manufacturing process. "Viewed as points on an absolute scale, 'mildly agitated' would involve less agitation than 'agitating the contents of the mixing chamber' as stated in claim 25, or 'mixing and agitating calcined gypsum and water' as stated in claim 36." *Id*.

The parties now dispute nine terms in claims 25 and 36. The court addresses the disputed language below.

DISCUSSION

A. Legal Standards Governing Claim Construction

Because an invention is defined by the claims of the patent, claim construction—the process of giving meaning to the claim language—defines the scope of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1311-12 (Fed. Cir. 2005) (en banc) (citing 35 U.S.C. § 112). Claim

construction is a matter of law for the court to determine. *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 391 (1996). As the Federal Circuit clarified in *Phillips*, the court begins the claim construction analysis with the words of the claims themselves, giving those words their ordinary and customary meaning, that is, the "meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention." *Phillips*, 415 F.3d at 1312-13. And that person is assumed to read the claim terms "in the context of the entire patent, including the specification." *Id.*

In addition to reading the claim terms in the context of the specification, the court may also consider the record of the patent's prosecution, as the record is evidence of how both the inventor and the Patent and Trademark Office understood the patent. *Id.* at 1317. The court must, however, be mindful that the prosecution history represents an "ongoing negotiation," so it "often lacks the clarity of the specification and thus is less useful for claim construction purposes." *Id.* Finally, in some cases, the court must go beyond the claim, the specification, and the prosecution history—the so-called intrinsic evidence—to consider extrinsic evidence such as technical dictionaries, treatises, and expert testimony. *Id.* at 1317-18. That extrinsic evidence is deemed less reliable than the intrinsic evidence for several reasons outlined by the Federal Circuit in *Phillips*. *Id.* at 1318-19.

Construction of the terms of a patent may be complicated when the terms are indefinite, a circumstance Defendants argue is present here. The Patent Act requires that a claim particularly point out and distinctly claim the subject matter which the applicant regards as his invention. 35 U.S.C. § 112. That requirement is met so long as "a person experienced in the field of the invention would understand the scope of the subject matter that is patented when the claim is read in conjunction with the rest of the specification." *S3 Inc. v. nVIDIA*, 259 F.3d 1364, 1367 (Fed. Cir. 2001); *see also Union Pacific Resources Co. v. Chesapeake Energy Corp.*, 236 F.3d 684, 692 (Fed. Cir. 2001). "A claim is not indefinite merely because it poses a difficult issue of claim construction; if a claim is subject to construction, *i.e.*, it is not insolubly ambiguous, it is not invalid

for indefiniteness." *Bancorp Services, LLC v. Harford Life Ins. Co.*, 359 F.3d 1367, 1371 (Fed. Cir. 2004). "[E]ven though the task may be formidable and the conclusion may be one over which reasonable persons will disagree, [courts] have held the claim sufficiently clear to avoid invalidity on indefiniteness grounds." *Exxon Research and Eng'g Co. v. United States*, 265 F.3d 1371, 1375 (Fed. Cir. 2001). Thus, "close questions of indefiniteness in litigation involving issued patents are properly resolved in favor of the patentee." *Id.* at 1380, quoted by *Bancorp Services LLC*, 265 F.3d at 1371.

With these legal standards in mind the court turns to construction of the disputed language in claims 25 and 36.

B. Mixing Chamber

Claim Term	**Plaintiff's Proposed Construction**	**Defendants' Proposed Construction**
mixing chamber	a device equipped with a powered moving agitator having one or more inlets through which at least calcined gypsum and water are inserted	an enclosed space where mixing occurs

The term "mixing chamber" is mentioned three times in Claim 25: first the calcined gypsum and water is inserted into the mixing chamber "through one or more inlets," then the chamber's contents are agitated to "form an aqueous dispersion of the calcined gypsum" and, finally, its contents are discharged "through a discharge outlet into a discharge conduit." ('635 Patent Claim 25.) Defendants propose reading "mixing chamber" as "an enclosed space where mixing occurs." (Def's Opening Br. at 16.) In contrast, Plaintiff would limit the term based on its reading of the patent specification and prior art to include a chamber with a powered agitator. (Pl's Br. at 10.) Plaintiff also proposes requiring that any mixing chamber have "one or more inlets through which at least calcined gypsum and water are inserted." The court rejects that addition as redundant: the

claim already specifies that the mixing chamber has calcined gypsum and water inserted into it through one or more inlets. *Cross Medical Products, Inc. v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293, 1307 (Fed. Cir. 2005).

According to Plaintiff, calcined gypsum and water cannot be agitated without a powered agitator, so when the claim refers to a mixing chamber in which those elements are agitated, it must be referring to a chamber "equipped with a powered moving agitator." (Pl's Br. at 10.) Limiting a patent to a preferred embodiment is improper, however. *E.g., Howmedica Osteonics Corp. v. Wright Medical Technology, Inc.,* 540 F.3d 1337, 1345 (Fed. Cir. 2008). Plaintiff's contention appears to confuse the claim terms based on its contention of what the physically possible embodiments are. The court rejects this argument because Plaintiff provides no support for its assertion about how calcined gypsum and water must be agitated. The Patent specification specifically notes that an implementation of the device could use one of many different agitator designs. ('635 Patent, col. 8, ll. 3-9.)

Where Plaintiff's proposed construction is too specific, Defendants' proposed construction is too general. (Def's Opening Br. at 16-18.) Any time two substances are placed in a chamber, some mixing occurs, but that does not require the conclusion that the enclosed space is a "mixing chamber." To distinguish between a chamber where mixing occurs incidentally and a chamber in which the mixing is intentional, the court relies on language from the Patent's background section that describes a mixing chamber as "containing a means for agitating the contents." ('635 Patent, col. 1, ll. 48-52.) The court also finds that the word "chamber" needs no construction because the ordinary meaning is sufficient. *O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1361 (Fed. Cir. 2008). Accordingly, the court adopts the following construction for "mixing chamber:" "a chamber containing a means for agitating its contents."

C. Aqueous Dispersion of the Calcined Gypsum

Claim Term	Plaintiff's Proposed Construction	Defendants' Proposed Construction
aqueous dispersion of the calcined gypsum	an aqueous dispersion of the calcined gypsum and water (and optionally other desired additives) but no foam	an aqueous dispersion of at least calcined gypsum and water (and optionally other desired additives)

Claims 25 and 36 both involve an "aqueous dispersion of the calcined gypsum" created by mixing calcined gypsum and water. ('635 Patent, Claim 25, 36.) The parties agree that the term is not limited to mixtures containing only calcined gypsum and water, but Plaintiff argues that it cannot refer to a mixture that contains foam. (Def's Opening Br. at 28-29, Pl's Br. at 23-24.) Plaintiff supports its proposed construction with references to the specification, which states three times that the aqueous dispersion contains no foam. ('635 Patent, col. 5, ll. 11-15, col. 8, l. 67-col. 9, l. 1, col. 11, ll. 5-7.) Defendants respond by pointing to different places in the specification that suggest that the aqueous dispersion may contain some foam. ('635 Patent, col. 5, ll. 60-65, col. 9, ll. 50-51.) This back and forth reveals that Claim 25, an open-ended "comprising" claim contemplates embodiments that contain no foam as well as embodiments that do contain some foam. *See CollageNet Inc. v. Apply Yourself, Inc.*, 418 F.3d 1225, 1235 (Fed. Cir. 2005). Accordingly, Plaintiff's proposed limitation is rejected, and the court construes "aqueous dispersion of the calcined gypsum" as "aqueous dispersion of the calcined gypsum and water (and optionally other desired additives)."

D. Discharge Conduit

Claim Term	Plaintiff's Proposed Construction	Defendants' Proposed Construction
discharge conduit	a passageway that receives contents of the mixing chamber through a discharge outlet and provides a mixing action to such contents without the use of a powered moving agitator as the contents are conveyed to a point where they are deposited onto the moving cover sheet.	a pipe or channel for conveying the contents of the mixing chamber from the discharge outlet of the mixing chamber to the moving cover sheet. The discharge conduit cannot be a mixing chamber, where a mixing chamber is an enclosed space where mixing occurs.

The next disputed term in Claim 25, "discharge conduit," comes into play in the manufacturing process after the mixing chamber: the contents of the mixing chamber are discharged into it and then an aqueous foam is inserted into it through an inlet, "such that the foam is mildly agitated to thereby minimize destruction of the foam while uniformly dispersing the foam in the aqueous gypsum dispersion." Next, "the resultant dispersion from the discharge conduit" is discharged and deposited "onto a moving cover sheet." ('635 Patent Claim 25.) In the court's view, both sides' proposed constructions of the term "discharge conduit" includes redundant terms. Plaintiff's construction again focuses on the involvement of a powered moving agitator. Defendants' construction downplays the purpose of the discharge conduit and seeks to incorporate Defendants' proposed construction of "mixing chamber" as something that the discharge conduit is not.

Defendants contend that the construction must make clear that the discharge conduit is not a mixing chamber because the patent specification so states. (Def's Opening Br. at 18.) In fact, the specification says only that the invention "completely avoids the expense, complexity, and other difficulties of the prior art involving two mixing chambers, while achieving similar or better results." ('635 Patent, col. 4, ll. 13-16.) This statement arguably precludes the use of two mixing chambers,

but it says nothing about the definition of "discharge conduit." The court has already rejected Defendants' construction of "mixing chamber" and sees no reason to so formally tie together the construction of the two terms. In fact, importing Defendants' definition of "mixing chamber" in the way Defendant proposes would ignore the claim, which specifies that the mixture is mildly agitated—that is, mixed—inside the discharge conduit. ('635 Patent, Claim 25, step 4.)

The court concludes both party's proposed constructions fail because they attempt to weigh down the terms with much more detail than is necessary. Parts of the method that are already included in the claim need not be incorporated into the construction of claim terms. Accordingly, the court begins and ends its construction with the plain and ordinary meaning of the terms. The jury will understand the word "discharge." "Conduit" may be unfamiliar, though, so the court will construe it as "passageway or channel." Accordingly, the court adopts the following construction for "discharge conduit:" "discharge passageway or channel."

E. Mildly Agitating

Claim Term	**Plaintiff's Proposed Construction**	**Defendants' Proposed Construction**
mildly agitated	being on the low end of an absolute scale which would involve less agitation than agitating the contents of the mixing chamber.	agitated gently, not significantly, on the low end of an absolute scale, and less than the level of agitation that results from inserting foam in the mixing chamber outside the lump ring.

The next term appears in both claims 25 and 36: the foam is inserted into the discharge conduit, "such that the foam is mildly agitated to thereby minimize destruction of the foam while uniformly dispersing the foam in the aqueous gypsum dispersion." As mentioned earlier, Judge Hart has already construed "mildly agitated." He concluded that, "mildly" should be given "its ordinary meaning of being on the low end of an absolute scale." *United States Gypsum Co.*, 508

F. Supp. 2d at 620. In so doing, Judge Hart expressly rejected USG's contention that "mildly agitate" means "less agitation than is applied when mixing the gypsum and water to form the aqueous dispersion." *Id.* In distinguishing the language of the patent from USG's proffered definition of "mild" as a relative term, Judge Hart said: "Those statements [in the patent], however, are true even if 'mildly agitated' is construed as an absolute term. Viewed as points on an absolute scale, 'mildly agitated' would involve less agitation than 'agitating the contents of the mixing chamber' as stated in claim 25, or 'mixing and agitating calcined gypsum and water' as stated in claim 36." *Id.*

Notwithstanding Judge Hart's standing construction, Defendants claim "mildly agitated" is indefinite because the patent does not identify "where the dividing line is between mild and not mild agitation." (Defs' Br. at 20). The bright line Defendants would require is not a precondition for definiteness. Use of terms of degree are ubiquitous in patent claims; such usages, when serving reasonably to describe the claimed subject matter to those skilled in the field of invention, and to distinguish the claimed subject matter from the prior art, have been accepted in patent examination and upheld by the courts. *Andrew Corp. v. Gabriel Electronics, Inc.*, 847 F.2d 819, 821 (Fed. Cir. 1988). The term "mildly agitating" is sufficiently clear to avoid indefiniteness. It clearly admits of a construction, since Judge Hart was able to provide one. Further, even had the court not previously construed the term, the court finds that a person skilled in wallboard construction would have understood "mildly agitating" to mean roughly what Judge Hart understood it to mean: agitating on the low end of an absolute scale. The court sees no reason to reconsider or depart from Judge Hart's construction.

If the court affirms Judge Hart's construction, Defendants urge, it should at least modify his language by defining mild as "gentle and not significant." The court finds the proposed modification adds nothing of value to the ordinary meaning of "mild," which does not require further definition. If anything, use of the language "not significant" is misleading. In common usage, mild is defined

as "moderate in action or effect," and "not being or involving what is extreme." MERRIAM WEBSTER COLLEGIATE DICTIONARY at 738 (10th ed. 1997). Insignificant is defined as "lacking meaning" and "not worth considering." *Id.* at 605. On the absolute scale proposed by Judge Hart, "mild" (being on the low end) seems to mean something greater than "not significant" (being almost nothing).

Both parties' proposed constructions suggest alternative points in the wallboard manufacturing process to serve as a reference point for determining just how much agitation is mild. The parties disagree, however, on which point in the process should serve as the reference. Plaintiff's proposed construction incorporates Judge Hart's language that mild agitation "would involve less agitation than agitating the contents of the mixing chamber," but Plaintiff takes Judge Hart's statement out of context. In effect, Plaintiff seeks to use the level of agitation in the mixer as a ceiling, under which everything is mild agitation. This is the very argument Judge Hart previously rejected. While Judge Hart's opinion indicates that "mild agitation" could be *described* by referring to other points in the manufacturing process, it makes clear "mild agitation" is to be *defined* as a point on absolute scale. In short, while the court has held that the parties may call witnesses and introduce evidence that compare levels of agitation at different points in the manufacturing process (i.e. the mixing chamber, lump ring, and discharge conduit, etc.), the definition of "mild agitation" itself is not relative. Mild agitation is assuredly less than the agitation that occurs in the mixer, but not every level of agitation below that of the mixer could accurately be called mild.

The court rejects Defendants' proposed construction for similar reasons. Defendants rely on the second embodiment of the patent, which depicts the foam intake inside the mixer, but outside the "lump ring," the outer periphery of the mixer. (Defs' Br. at 22-23; '635 Patent, Figure 3, element 30.) The patent does not identify the configuration depicted in the second embodiment as giving rise to "mild agitation." As a result, Defendants urge the court to draw the negative inference that the second embodiment acts as a limit on the level of agitation that could constitute "mild."

Defendant's logic is tortured. It does not follow that because the patent fails to refer to the second embodiment as mild, it therefore must be understood to describe the second embodiment as "not mild." The disputed claims themselves make no reference to the "lump ring" and the description of the embodiment makes it clear that the claims are not limited to the type of mixing chamber depicted in the second embodiment. ('635 Patent col. 8, ll. 4-9) ("It should be appreciated that this depiction of an agitator is relatively simplistic and meant only to indicate the basic principles of agitators commonly employed . . . . Many different, and often more complex, agitator designs (having vertically extending pins or paddles, different shapes, etc.) can also be employed.") There is simply no reason to conform the term "mildly agitated" by measuring it against a substantially unrelated embodiment of the patent. Further, as Judge Hart observed, it is not necessary to define "mildly agitate" by comparing it to other steps in the manufacturing process. The ordinary meaning of the word "mild" is sufficient.

The court adheres to Judge Hart's existing construction. Accordingly, the court adopts the following construction for "mildly agitating": "agitating on the low-end of an absolute scale."

F. Minimize Destruction of the Foam

Claim Term	**Plaintiff's Proposed Construction**	**Defendants' Proposed Construction**
[to thereby] minimize destruction of the foam	to reduce foam loss by inserting foam in such a way that it is "mildly agitated."	the least possible destruction of the foam

The next term follows the "mildly agitated" language in both claims 25 and 36. Defendants first contend that this term is indefinite because the term "offers no guidance or standard for measuring how much foam can be destroyed and still be minimized." (Defs' Br. at 24.) Again, Defendants urge a level of specificity that is not required for definiteness under the Patent Act. Claims must be read in view of the specification, of which they are a part. *Markman*, 52 F.3d at 978. Reading the claim in context, a person skilled in wallboard manufacture would understand the

scope of the subject matter. As the background portion of the patent explains, a fundamental problem in wallboard manufacture is how best to "disperse the foam relatively uniformly in the slurry while not destroying any more of the foam or producing any larger variations in bubble size than is unavoidable." ('635 Patent, col. 2, ll. 49-52.) In that context, the disputed terms of claims 25 and 36—"to thereby minimize destruction of foam while uniformly dispersing the foam in the aqueous gypsum dispersion"—clearly indicate the scope of the subject matter. When read together, the terms indicate the invention achieves low levels of foam destruction while maintaining an even distribution of foam. This indication is sufficiently definite. The patent need not give an accounting of foam destruction with mathematical precision in order to be valid. *Modine Mfg. Co. v. U.S. Int'l Trade Comm'n*, 75 F.3d 1545, 1557 (Fed. Cir. 1996).

Again, each party's proposed construction of this term is unsatisfying. Plaintiff urges the court to consider the term in context and to construe "minimize" as to "reduce foam loss by inserting foam in such a way that it is mildly agitated." The court notes, first, that use of the term "mildly agitated" here is redundant. Although the court must consider terms in context, each term may be construed without repetition. The court further rejects Plaintiff's proposed construction of the term "to minimize" as meaning "to reduce." In its ordinary meaning, "to minimize," meaning "to keep to a minimum," has a more specific connotation than merely "to reduce." MERRIAM-WEBSTER'S COLLEGIATE DICTIONARY at 741 (10th ed. 1997). In this usage, *to minimize* denotes an effort to reduce to the "least quantity assignable, admissible, or possible." *Id*. Defendants' proposed construction, "the least possible destruction of foam," comes closer to this connotation. Defendant's proposed construction is imperfect, however. It implies that "least possible" is a finite quantity; but the context of the claim suggests "minimize" is used here as a relative term. Efforts to *minimize* must be balanced against effort to achieve *uniformity* and other circumstances of manufacture.

Accordingly the court adopts the following construction for "minimize destruction of the foam": "to reduce destruction of the foam as much as possible given the circumstances."

G. Uniformly Dispersing the Foam

Claim Term	Plaintiff's Proposed Construction	Defendants' Proposed Construction
uniformly dispersing the foam [in the aqueous gypsum dispersion]	uniformly dispersing the foam in the aqueous gypsum dispersion	dispersing foam into the slurry such that the resulting mixture in homogeneous throughout the entire slurry

The next disputed term occurs in conjunction with "minimize destruction of the foam" in both claims 25 and 36, but the court confines its construction here to the words "uniformly dispersing the foam." Defendants contend the term "uniformly," here and elsewhere, is indefinite because the patent does not adequately describe the point at which a dispersion is considered uniform. Again, Defendants push for a bright line that the law does not require. The patent itself makes clear that it does not purport to invent the concept of uniformity in gypsum products. ('635 Patent col. 1, ll. 23-30)("It is also well known to produce a lightweight gypsum product by uniformly mixing an aqueous foam into the slurry to produce air bubbles therein. This will result in a uniform distribution of voids in the set gypsum product.") Uniform distribution was and is a well-known concept in the art of gypsum product manufacture. (*See, e.g*., U.S. Patent 5,643,510 (Sucech) and U.S. Patent 5,085,929 (Bruce)). The term is not indefinite.

Defendants next contend that the court should construe the term to require "homogeneity" throughout the entire slurry. Judge Hart has previously determined that the term uniformity refers only to the core, not the edges, of the wallboard. *United States Gypsum Co.,* 508 F. Supp. 2d at 616. Defendants' proposed reference to the *entire* slurry would, thus, be misleading. But even referring only to the core slurry, the court sees no benefit to construing uniformity to require homogeneity. Homogeneity connotes perfectly "identical distribution functions." WEBSTER COLLEGIATE DICTIONARY at 738 (10th ed. 1997.) The term is more technical than "uniform," which means "presenting an unvaried appearance of pattern" in ordinary usage. *Id*. at 1292. Confusing

the ordinary meaning of "uniform" by adding additional technical terms will not aid the jury. The ordinary meaning of uniform is consistent with its usage in the specification, which does not appear to require exact mathematical precision in foam and void distribution. Relying on the ordinary meaning alone is sufficient. *O2 Micro Int'l Ltd.*, 521 F.3d at 1361. Accordingly, the court accepts Plaintiff's proposal and finds that this term requires no further construction.

H. Voids Uniformly Dispersed Therein

Claim Term	**Plaintiff's Proposed Construction**	**Defendants' Proposed Construction**
voids uniformly dispersed therein	voids uniformly dispersed therein	voids equally dispersed throughout all planes, or in all three dimensions, of the gypsum board core

The next term comes at the end of both claims 25 and 36: as a result of the foam distribution, the formed gypsum has "voids uniformly dispersed therein." The patent makes clear that voids result from the distribution of the foam ('635 Patent col. 1, ll. 23-30). The court also presumes that when the same term appears in different portions of the claim it has the same meaning. *Paragon Solutions, LLC v. Timex Corp.*, 566 F.3d 1075, 1087 (Fed. Cir. 2009). "Uniformly," as it is ordinarily understood, means the same thing when applied to voids as when applied to foam. Accordingly, for the reasons stated above, the court finds that this term is not indefinite and needs no further construction.

I. Dividing the Aqueous Dispersion to Form a Core Stream

Claim Term	Plaintiff's Proposed Construction	Defendants' Proposed Construction
dividing the aqueous dispersion to form a core stream	diverting a major portion of the aqueous dispersion from an outlet of the mixing chamber into a discharge conduit	dividing the aqueous dispersion into a core stream and an edge stream or streams

The next term comes in the second step in Claim 36 that occurs after the calcined gypsum and water is mixed and agitated. ('635 Patent Claim 36.) Defendants' proposed construction is entirely superfluous. (Def's Opening Br. at 29-30.) The entire step is as follows: "dividing the aqueous dispersion to form a core stream of the aqueous dispersion and one or more edge streams of the aqueous dispersion." The court cannot understand how it would aid the jury to construe the first part of the step to include language found in the second part of the step. Plaintiff's proposed construction is also problematic: it would add limitations based on one of the patent's possible embodiments and an unexplained reference to the prior art. Neither supports Plaintiff's proposed construction. Accordingly, the court finds that this term needs no construction.

J. Depositing the Edge Stream or Streams onto the Cover Sheet

Claim Term	Plaintiff's Proposed Construction	Defendants' Proposed Construction
Depositing the edge stream or streams onto the cover sheet	Depositing the separated stream or streams onto the cover sheet	Depositing onto the edge or edges of the cover sheet a stream of relatively dense gypsum slurry

The final disputed phrase is found in Step 5 of Claim 36. Plaintiff's only proposed change is to read "edge stream or streams" as "separated stream or streams." (Pl's Br. at 25-26.) Defendants, on the other hand, propose changing the sequence of terms within the phrase, reading "edge stream or streams" as "a stream of relatively dense gypsum slurry," and reading "cover sheet"

as "edge or edges of the cover sheet." (Def's Opening Br. at 27-28.) Defendants' first proposed alteration is easily dismissed because Defendants provide no support for it. The second proposed alteration, though, is more complicated: Defendants argue that an edge stream must be deposited on the edge of the cover sheet, but Plaintiff argues that the edge stream can be deposited anywhere on the cover sheet.

Plaintiff purports to find support for its construction in the court's summary judgment order, which construed Claim 36 in part. Judge Hart ruled that Claim 36 literally requires that "the core stream is to be deposited prior to the edge stream," but the claim "does not require that an edge stream be deposited immediately next to the core stream." *U.S. Gypsum Co.*, 508 F. Supp. 2d at 618. The court sees no reason to deviate from this reading of the claim, but it also does not see what this reading says about the disputed phrase. Judge Hart's construction is consistent with the arguments of both sides regarding where the edge stream is placed.

To argue that the edge stream must be placed at the edge of the cover sheet, Defendants begin with the phrase "edge stream" and argue that Plaintiff's construction would read the word "edge" out of the claim. If the stream were placed in the middle of the cover sheet, Defendants argue, it would be a middle stream, not an edge stream. (Def's Opening Br. at 27.) Plaintiff disagrees and reads "edge stream" as referring to where the stream's slurry will be in the finished product, not to where it goes on cover sheet. (Pl's Br. at 26.) Defendants also point to an embodiment discussed in the specification that describes slurry being "deposited contiguous to the edges." ('635 Patent, col. 8, ll. 40-45.) As already explained, though, the court will not rely on a single embodiment to limit claim terms. Ultimately, both possible readings are sensible, but Defendants' is more limited. Because there is no evidence of intent to limit the term, the court adopts Plaintiff's reading that the edge stream need not be placed on the edge of the cover sheet, though it must end up on the edge of the finished product.

Plaintiff's proposed construction would go further, though, and replace the word "edge" with

"separated." That substitution could be understood as eliminating the requirement that the edge stream's slurry find its way to the edge of the finished board. Accordingly, the court rejects Plaintiff's proposal as well as Defendants'. This phrase also needs no construction.

CONCLUSION

Claim terms in the '635 patent are construed in accordance with the foregoing.

ENTER:

Dated: November 2, 2009

REBECCA R. PALLMEYER
United States District Judge